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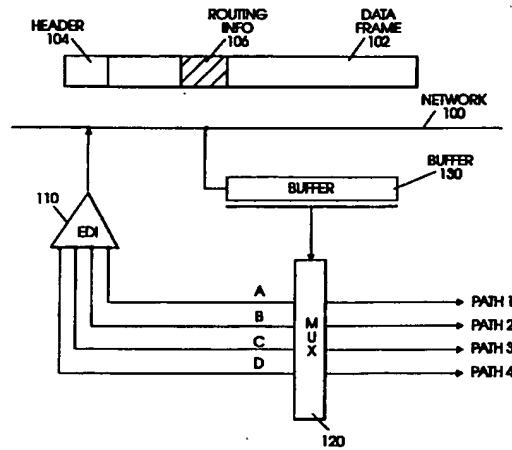
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### ④ Dynamic realtime routing in a data communications network.

⑤ A dynamic realtime routing mechanism is disclosed for a data communications network, which provides an Event Driven Interface to perform realtime routing of data frames over one of a plurality of destination paths. The Event Driven Interface is programmed with control vectors to identify routing bit patterns in the data frames on the data communications network. Enabling signals produced by the Event Driven Interface are applied to the control input of a multiplexer whose data input is connected to the data communications network. The multiplexer will steer the data frames from the data communications network to one of a plurality of output routing paths, in response to the enabling signals it receives from the Event Driven Interface.



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### Technical Field

The invention disclosed broadly relates to the extraction of information from large bodies of data for high speed communication facilities, and more particularly relates to the dynamic realtime routing of data frames in a data communications network.

### Background Information

This invention is related to the copending European patent application serial number 237 267, entitled "Event Driven Interface for a System for Monitoring and Controlling a Data Communications Network," by P. C. Hershey, et al., assigned to the IBM Corporation and incorporated herein by reference.

The above cited copending patent application by Hershey, et al. describes the Event Driven Interface which is a mechanism for identifying bit patterns in the serial bit stream of a data communications network. The Event Driven Interface performs pattern recognition based upon a program defined by control vectors. The Event Driven Interface has an input connected to the data communications network for receiving the serial bit stream and for performing a logical pattern recognition on the serial bit stream to produce event vector signals as an output in response to the identification of specific, predefined patterns in the bit stream.

It would be useful to apply the realtime pattern recognition capability of the Event Driven Interface, to the problem of performing realtime routing of data frames and other portions of the serial bit stream in the data communications network.

### Objects of the Invention

It is therefore an object of the invention to perform dynamic realtime routing of data frames in a data communications network.

It is still another object of the invention to perform realtime dynamic routing of serial bit streams in a data communications network.

### Summary of the Invention

These and other objects, features and advantages are accomplished by the invention. The invention is the use of an Event Driven Interface to perform routing selection functions in a data communications network. The data communications network will transmit data frames which include routing information in a segment of the data frame. The Event Driven Interface has an input connected to the network for receiving the serial bit stream and for performing pattern recognition on the serial bit stream based upon a programmed set of logic

paths defined by control vectors. In accordance with the invention, a plurality of programmed logic paths in the Event Driven Interface produced corresponding output enabling signals which are applied as the steering signals to a multiplexer. The multiplexer has a data input which is coupled to the data communications network, for receiving a data frame and for steering the data frame out onto one of a plurality of destination paths based upon the enabling signal applied to the multiplexers' control inputs from the Event Driven Interface. In order to accommodate data frames whose routing information lies encapsulated within the body of the data frame, a buffer can be included between the data input of the multiplexer and the network, to buffer the part or all of the data frame until sufficient logic processing of the routing information is performed by the Event Driven Interface, such as is necessary to apply the appropriate enabling signal to the control input of the multiplexer. In this manner, realtime routing of data frames on the data communications network, can be accomplished.

### Description of the Figures

These and other objects, features and advantages will be more fully appreciated with reference to the accompanying figures.

Fig. 1 is a schematic block diagram of the invention, showing the Event Driven Interface coupled to a multiplexer, for providing pasturing signals for a data frame received off the network.

### Description of the Preferred Embodiment

The problem solved is how to route packets in a serial data stream to a plurality of destinations in realtime. In addition, the problem of how to switch from a first routing mechanism to a second routing mechanism in realtime, using inband information.

This invention disclosure relates to the Event Driven Interface for a system for monitoring and controlling a data communications network invention which is described in the copending European patent application as mentioned above. In that patent application, the Event Driven Interface is described, which is a logic tree whose input is connected to a serial data stream. The logic tree is configured so that individual patterns of binary bits can be identified and when they are identified, they trigger a count.

In the invention disclosed in this disclosure, the Event Driven Interface has its output signal connected as a control input to a multiplexer. The input of the multiplexer is connected to the serial data stream. In this manner, the Event Driven Interface logic tree can identify individual destination address bit patterns, and output an appropriate

control signal to the multiplexer, thereby switching the destination connection for the serial data stream to the intended destination location whose address is represented by the data pattern in the bit stream.

As a matter of definition, packets are referred to by other terms in the data communications industry, for example data packets can be "cells," they can be protocol data units, they can be path information units, they can be frames. These various terms refer to the same type of entity, that is a series of bits in a bit stream which are considered as a unit and routed as a unit from an origin to a destination in the network.

Fig. 1 shows the network 100 which communicates data frames such as the data frame 102 which includes a header portion 104, a routing information portion 106 and other information portion 108. The Event Driven Interface (EDI) 110 has its input connected to the network 100. The Event Driven Interface is described in greater detail in the copending patent application Hershey, et al. cited above. Each respective logic path defined by the control vectors in the Event Driven Interface 110, will have a corresponding output terminal. Each corresponding output terminal will produce an enabling signal. The Event Driven Interface 110 is programmed to identify bit patterns corresponding to various routing paths such as path 1, path 2, path 3 and path 4 in Fig. 1. The routing information portion 106 of the data frame 102, will have a characteristic bit pattern corresponding to each of the respective paths 1, 2, 3 and 4. In accordance with the invention, the Event Driven Interface 110 will identify each respective routing information bit pattern, and produce a corresponding enabling signal on one of the enabling lines A, B, C or D which are applied to the multiplexer 120.

Also connected to the network 100 is the buffer 130 which will buffer a part or all of the data frame 102 at least until the bit pattern from the routing information 106 has been deciphered by the Event Driven Interface 110. The output of the buffer 130 is applied to the data input of the multiplexer 120. When sufficient bit pattern for the routing information 106 in the data frame 102, has been deciphered by the Event Driven Interface 110, a corresponding enabling signal is output on one of the enabling lines A, B, C or D to the multiplexer 120, and at that time, the contents of the buffer 130, which contain the data frame 102, can be output on the selected one of the several paths 1, 2, 3 or 4. In this manner, realtime routing of the data frame 102 can be performed in an improved manner.

Although a specific embodiment of the invention has been disclosed, it will be understood by those having skill in the art that changes can be made to the specific embodiment without departing

from the scope of the invention.

### Claims

- 5 1. An apparatus for monitoring and controlling a data communications network which communicates a serial stream of binary bits having a characteristic pattern, for data frames which include routing information, a dynamic routing means, characterized in that it comprises:  
10 an Event Driven Interface having an input coupled to said data communications network, programmed to identify routing patterns in said routing information of said data frames, for outputting an enabling signal in response to identifying said routing bit patterns;  
15 a multiplexer having a plurality of control inputs coupled to said outputs of said Event Driven Interface and having a data input coupled to said data communications network for receiving said serial bit stream, and having a plurality of output paths, for outputting said serial bit stream over one of said plurality of output paths in response to said enabling signal received from said Event Driven Interface.
- 20 2. The apparatus of claim 1 which further comprises:  
25 a data frame buffer having an input coupled to said data communications network and an output coupled to said data input of said multiplexer, for buffering said data frame.
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